

Bellwork: 12/17/12

Factor each expression:

1) $18x^2 - 98$

$$2(9x^2 - 49)$$
$$2(3x+7)(3x-7)$$

$$(3x-12)(2x-8)$$
$$(6x-9)(x-4)$$

2) $6x^2 - 33x + 36$

$$3(2x^2 - 11x + 12)$$
$$(2x^2 - 8x - 3x + 12)$$
$$2x(x-4) - 3(x-4)$$
$$3(x-4)(2x-3)$$

$$\frac{216}{1}$$

$$\frac{24}{1 \overline{) 24}} \\ \underline{-24} \\ 0$$

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Section 4.5 - Solving Quadratic Equations

When you are asked to find the ROOTS or ZEROS of a function, it all means the same thing...

FIND THE X-INTERCEPTS (remember they occur when $y=0$)

Therefore, to find the ROOTS or ZEROS of any quadratic equation, simply set the function equal to 0 and solve for x.

There are many ways to solve a quadratic equation, the easiest being to solve by FACTORING!

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Solve each of the following equations by factoring:

1) $x^2 + 5x + 6 = 0$

$$(x+2)(x+3) = 0$$

$$\begin{array}{l} x+2=0 \\ \boxed{x=-2} \end{array}$$

$$\begin{array}{l} x+3=0 \\ \boxed{x=-3} \end{array}$$

$$\begin{array}{r} x+2=0 \\ \sim 2 \quad \sim 2 \\ \hline x=-2 \end{array}$$

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2) $x^2 - 16 = 0$

$$(x+4)(x-4) = 0$$

$$\begin{array}{l} x+4=0 \\ \boxed{x=-4} \end{array}$$

$$\begin{array}{l} x-4=0 \\ \boxed{x=4} \end{array}$$

~~$$-4^2 - 16 = 0$$~~

$$\boxed{(-4)^2 - 16 = 0}$$

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$$3) \quad 3x^2 - x = 2$$

$$\begin{array}{r} -2 \quad -2 \\ \hline 3x^2 - x - 2 = 0 \end{array}$$

$$\begin{array}{r} 6 \\ 1 \overline{) 6} \\ \underline{6} \\ 0 \end{array}$$

$$\begin{array}{|c|c|} \hline 2 & 3 \\ \hline \end{array}$$

$$(3x^2 - 3x + 2x - 2) = 0$$

$$3x(x-1) + 2(x-1) = 0$$

$$(x-1)(3x+2) = 0$$

$$x-1=0$$

$$\boxed{x=1}$$

$$3x+2=0$$

$$\boxed{x = -\frac{2}{3}}$$

$$\begin{array}{r} 3x+2=0 \\ -2 \quad -2 \\ \hline 3x = -2 \\ \underline{3} \quad \underline{3} \\ x = -\frac{2}{3} \end{array}$$

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$$4) \quad 5x^2 + 7x = 0$$

$$x(5x+7) = 0$$

$$\boxed{x=0}$$

$$\begin{array}{r} 5x+7=0 \\ -7 \quad -7 \\ \hline 5x = -7 \\ \underline{5} \quad \underline{5} \\ x = -\frac{7}{5} \end{array}$$

$$\boxed{x = -\frac{7}{5}}$$

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$$\begin{aligned}
 5) \quad 6x^2 &= 4x \\
 &\quad -4x \quad -4x \\
 \hline
 6x^2 - 4x &= 0 \\
 2x(3x - 2) &= 0
 \end{aligned}$$

$$\begin{aligned}
 2x &= 0 \\
 \boxed{x} &= 0
 \end{aligned}$$

$$\begin{aligned}
 3x - 2 &= 0 \\
 &\quad +2 \quad +2 \\
 \hline
 3x &= 2 \\
 \frac{3x}{3} &= \frac{2}{3} \\
 \boxed{x} &= \frac{2}{3}
 \end{aligned}$$

$$6) \quad 6x^2 - 15x - 6 = 1 - 4x$$

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